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(54) Device and method for the sterilisation of compressed air for medical use

(57) The present invention relates to an apparatus and the relevant method for sterilising air for medical use, and in particular relates to a device that is applied to the air compressors used in the dentists' apparatuses.

According to the invention, we use the heat of the air coming out from the air outlet provided on the head of the compressor, to reduce the bacterial charge of a filtering cartridge fitted on the conduits that feed the air to the devices.

In particular the device comprises a body containing said sterilising cartridge and enclosing a pipe coil or a conduit through which the air coming out of the head of the compressor passes, so that it is possible to use this heat for heating the cartridge thus reducing the bacterial charge of the same every time the compressor is turned on, without the need of disassembling parts or components.

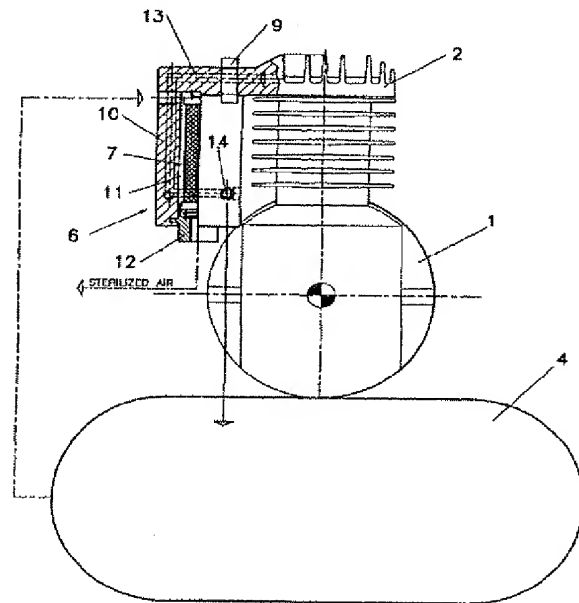


FIG. 1

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## Description

The present invention relates to an apparatus and the relevant method for sterilising air for medical use, and in particular relates to a device that is applied to the air compressors used in the dentists' apparatuses.

According to the invention, we use the heat of the air coming out from the air outlet provided on the head of the compressor, to reduce the bacterial charge of a filtering cartridge fitted on the conduits that feed the air to the devices.

In particular the device comprises a body containing said sterilising cartridge and enclosing a pipe coil or a conduit through which the air coming out of the head of the compressor passes, so that it is possible to use this heat for heating the cartridge thus reducing the bacterial charge of the same every time the compressor is turned on, without the need of disassembling parts or components.

There are several cases, in particular in the field of dental care, in which air treated against bacteria is needed.

For instance, in the case of the dentists' apparatuses air jets are used for cleaning operations, for driving the drills, for the cooling of the tools, etc.

Since these air jets often get in contact with wounds, we need to be sure that the air is sterile.

For this purpose the air, taken from a tank, is driven to the apparatuses passing through a sterilising filter.

In the known devices these filters are placed along an air feeding pipe, and are housed in boxes that can be disassembled or opened, so as to allow the removal of the filter for periodical sterilisation.

These operations, even if not particularly difficult, need time and diligence of the operator, who disassembles the filter, sterilises it in an autoclave and assembles it again.

This is the reason why one often forget or fail doing it.

The present invention relates to this field and proposes a device for air sterilisation comprising a body which contains a filtering cartridge and that has a pipe coil or conduit connected at one side to the air outlet on the head of a compressor and at the other side to a tank for the compressed air. In this way it is possible the make use of the heat of the air leaving the compressor to reduce the bacterial charge of the cartridge every time the device is turned on.

The present invention will now be described in detail, as an example, with reference to the following figures:

- figure 1 schematically shows a device according to the invention applied to a compressor;
- Figure 2 shows schematically the lay-out of a device for the production of sterilised compressed air;
- Figure 3-5 schematically show different embodi-

ments of the device according to the invention.

Reference is made to fig.2, that shows a scheme of a device for the production of sterilised compressed air.

Number 1 shows a compressor in its whole, wherein the head 2 is connected, through a conduit 3, to a storage tank 4.

N. 5 indicates the outlet conduit of the tank, which passes through a sterilisation device indicated as a whole with number 6.

This conduit is connected to the tools of a dentists' apparatus.

According to the invention, this sterilising device comprises a sterilising cartridge 7 housed in the body 6 and a conduit or a pipe coil 8, which is part of the air supply circuit 3 from the head to the tank.

This pipe coil is fitted all around the cartridge, so that the compressed air coming out from the head 2, may disperse its heat to the cartridge itself, which is so thermally treated.

Figure 1 shows in details the device according to the invention.

Number 1 indicates the body of the compressor, while number 2 indicates the head of a cylinder in which the air is compressed.

The air comes out through a connection 9.

A sterilisation device 6 - comprising a body 10 provided with a seat 11 housing the cartridge 7 - is applied to the compressor.

A connection 12 is both used to keep the cartridge in its seat and to feed it with the compressed air coming from the tank.

The body 10 is also provided with a conduit, preferable pipe-coil-shaped, indicated as n. 3 in the figure, that connects the attach 9 on the outlet of the head 2 with a conduit 14 directed to the storage tank.

When the compressor is turned on, the air comes out from the head 2, through the connection 9, at a high temperature, usually from 100° to 130° C.

The air then passes through the pipe coil 13 where it cedes its heat by convection to the body 10.

When the air comes out from the pipe coil, it is directed to the storage tank along the conduit 14 and, when it is used, it comes out from the tank to go to the tools passing through the sterilising cartridge.

The heat that has been transferred to the body 10 by the air leaving the head 2, heats also the cartridge 7, that is then treated every time the compressor is used, thus avoiding the need to remove it from its seat.

The device according to the invention could then be made in different embodiments, some of which are schematically shown in fig 3-5.

The seat of the cartridge could be obtained in a body fitted to the head of the cylinder as shown in fig. 3, or could be obtained directly from the block of the compressor as shown in fig. 4. It could also be obtained directly from the cooling wings of the head of the cylinder, in order to use the heat produced by the air com-

pression to raise the temperature of the cartridge enough to ensure the sterilisation.

### Claims

1. Compressed air sterilisation device for medical use, characterised in that means are provided which use the heat produced during the air compression to heat a filtering cartridge to a temperature high enough to ensure a thermal treatment of the air itself. 5 10
2. Compressed air sterilisation device according to claim 1, comprising a compressor for obtaining compressed air, a storage tank for said compressed air, a body that contains a filtering cartridge, said filtering cartridge being connected with to the air outlet of said tank to eliminate the bacterial charge of the air leaving said tank, characterised in that means are provided, to direct the hot air coming out from the compressor to said body containing said cartridge, in order to heat this cartridge at a temperature high enough to avoid the proliferation of the bacterial charge. 15 20 25
3. Device according to claim 2, characterised in that said means that direct the hot air from the compressor to the filtering cartridge, comprise a conduit, fitted inside said body around the seat of said cartridge, said conduit connecting the outlet of the compressor with the inlet of said storage tank. 30
4. Device according to claim 2, characterised in that said filtering cartridge is fitted in a seat provided in the wings of the compressor cylinder. 35
5. Device according to claim 2, characterised in that the seat of said cartridges is fitted directly into the body of the compressor. 40
6. Method for the sterilisation of compressed air for medical use, characterised in that the heat produced during the air compression is used to heat the cartridge to temperature high enough to avoid the proliferation of the bacterial charge. 45

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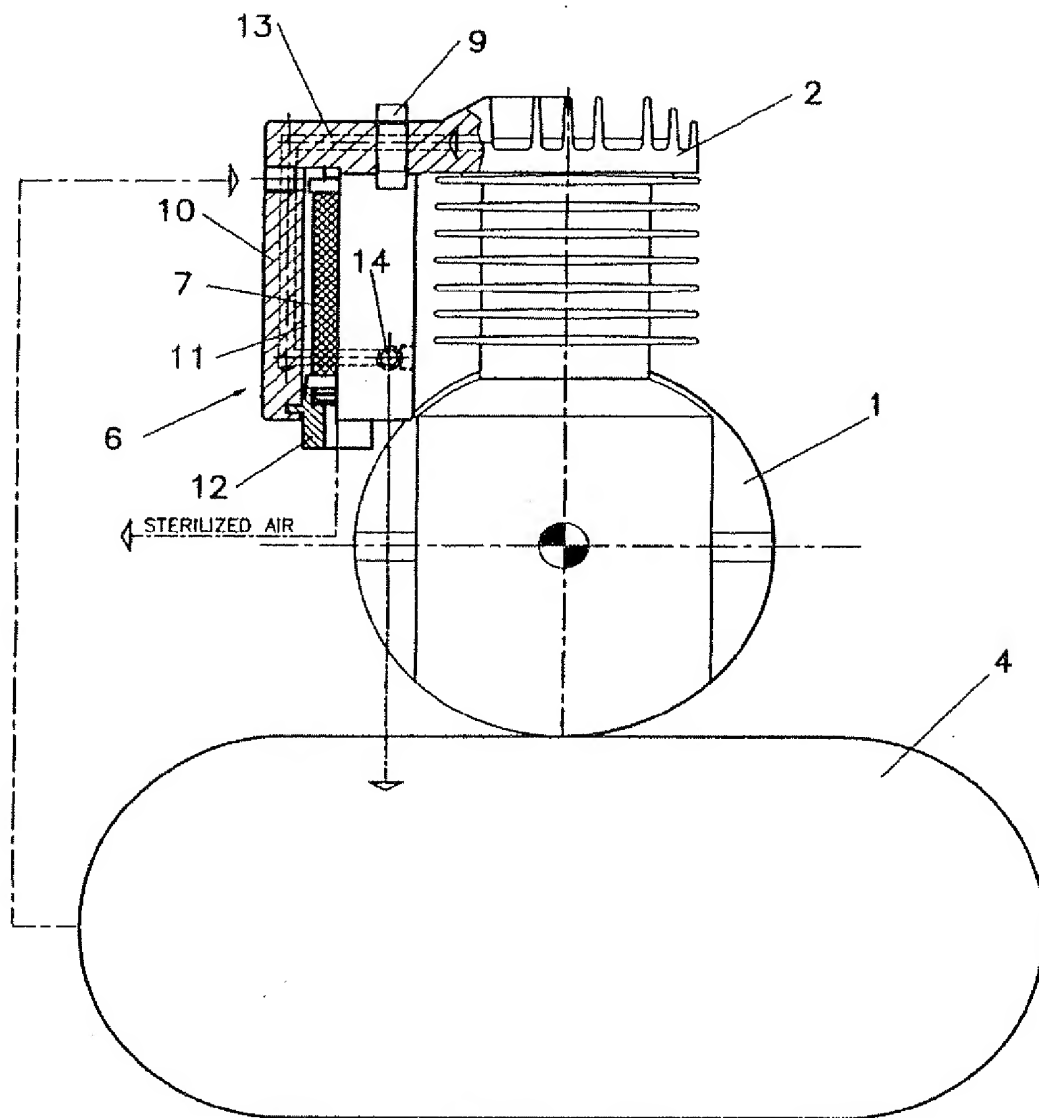


FIG. 1

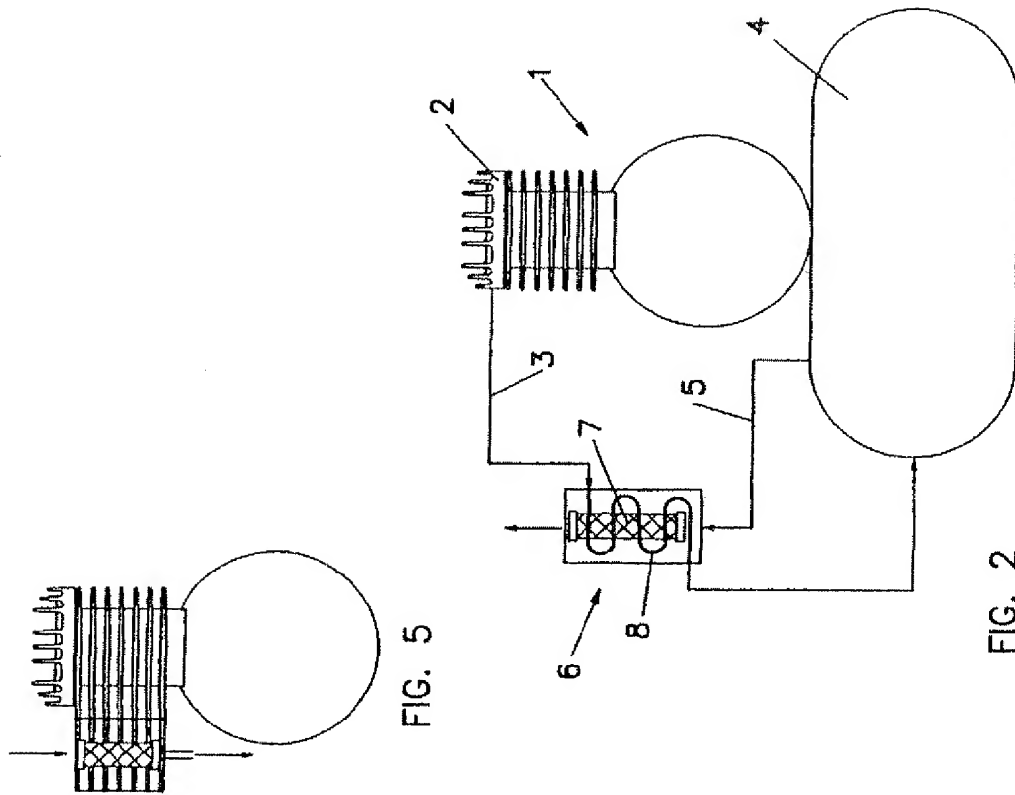


FIG. 2

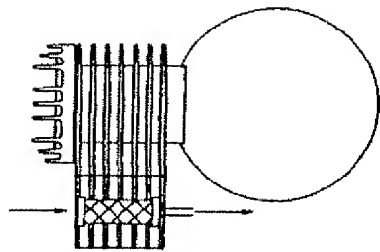


FIG. 5

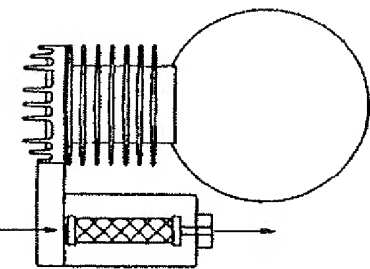


FIG. 3

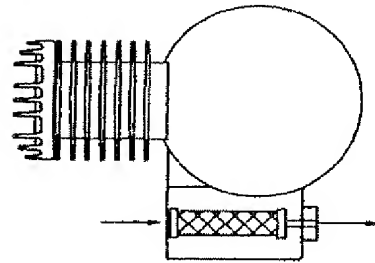


FIG. 4

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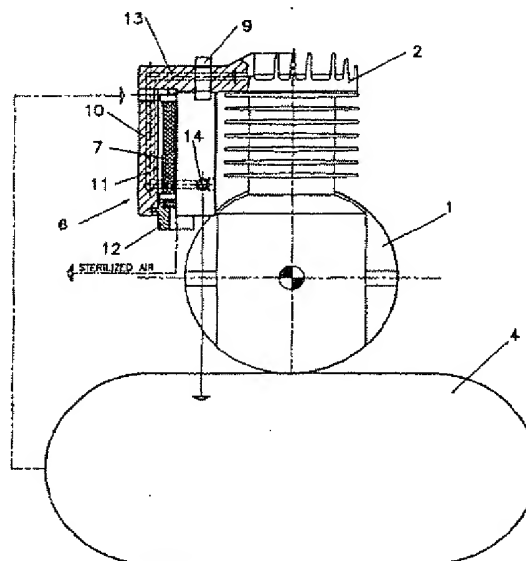


FIG. 1

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Application Number  
EP 97 11 2536

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A	---	2-5	
X	EP 0 437 271 A (FOIDL LEONHARD) 17 July 1991 (1991-07-17) * column 2, line 3 - column 3, line 38 * * figure *	1,6	
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A	---	1-6	
A	US 5 441 710 A (MAROIS JEAN-LUC) 15 August 1995 (1995-08-15) * column 1, line 32 - column 2, line 16 * * column 2, line 33 - column 3, line 12 * * figures 1,2 *		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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The present search report has been drawn up for all claims			
Place of search <b>MUNICH</b>		Date of completion of the search <b>5 July 1999</b>	Examiner <b>Bauer, H</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)



**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 97 11 2536

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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